

Ticona Bishop Flare Section 114 Discussion

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Presentation Overview

- ▶ Background
- ▶ Actions to address findings
 - MS Flare
 - 4HAP Flare
 - GUR Flare
 - MO-3 Flare
 - MO-4 Flare
- ▶ Questions and Next Steps

Background

- ▶ 7/2/2010 – Initial Section 114 Letter received
- ▶ 8/30/2010 – Response to initial letter submitted
- ▶ 2/28/2011 – Supplemental information submitted
- ▶ 7/18/2011 – Supplemental information submitted
- ▶ 12/28/2011 - Supplemental information submitted
- ▶ 2012 - Progress reports submitted approximately every 3 weeks until corrective actions completed

Issue Summary/Actions to Address Findings

MS = Non-assisted flare; enrichment gas & Btu value verified.

4 HAP = Heating value; implemented critical task SOP.

GUR = Steam to vent gas ratio; steam to vent gas ratio controlled from DCS.

MO-3 = Operated as steam-assisted flare; hydrogen stream recalculated using 1212 Btu value.

MO-4 = Operated as steam-assisted flare; enrichment gas line resized to increase Btu value.

MS Flare

- ▶ EPA initially identified 31,372 events for the MS Flare in which Net Heating Value (NHV) < 200 Btu/scf.
- ▶ 8-30-2010 submittal contained incomplete calculations for NHV.
- ▶ 2-28-2011 submittal included natural gas for pilots and make-up.
- ▶ 7-18-2011 submittal included only enrichment natural gas for make-up.
- ▶ Based on the 7-18-2011 data, there are no instances with NHV < 200 Btu/scf.

MS Flare – Actions to Address

- ▶ The flare operates as a control device for 3 methanol transfer tanks.
- ▶ Enrichment gas has always been piped to the MS flare.
- ▶ When the MS unit was operating as a production unit the control for the enrichment gas was on a field mounted controller.
- ▶ The hand controller was changed to an electronic controller in late 2006.
- ▶ The flare requires enrichment gas to maintain 200 Btu due to the low vent stream .

PI Data submitted 1/12/2012 for NG flow to flare from 2007 – 2010

Data on Confidential Disc

FLARE	Initial EPA Findings Btu/scf	Current Status Based on PI Compliance Data
MS	31,372 Events < 200	0 Events < 200

4HAP Flare

- ▶ EPA identified 33 flare events in which Net Heating Value (NHV) < 300 Btu/scf.
- ▶ In 28 of the 33 events, there was no vent to the 4HAP Flare.
 - 27 events resulted from the calculation assuming a level increase in the tank being transferred into from a trailer. Because the tank and trailer were vapor balanced, there was no venting to flare.
 - 1 event (6-28-2007) resulted from a false indication of level change in a tank due to the pressure transmitter being calibrated on it.
- ▶ On 5 occasions, a pressure change in a storage tank from offloading activities resulted in venting to the 4HAP flare.
 - On 5 occasions there were Hydrogen Fluoride (HF) emissions routed to flare.
 - All events were of short duration, no VOC emissions routed to flare.
 - Worst case estimates from the 5 events (assuming 1 hour duration) is 0.18 lbs HF.

4HAP Flare Actions to Address

- ▶ Ticona has many Critical Task Standard Operating Procedures (CTSOP's) used throughout the facility.
 - A CTSOP must be in the operator's possession at the time the task is being completed.
 - Requires an additional layer of approval for each step as it is completed.
- ▶ Requirements have been added to the following 3 CTSOP's at the relevant steps making the operators aware of the required pressure setting when making HF transfers:
 - SOP PR- 4HAP-315-02 "Prepare V-2816 Operation New"
 - SOP 4HAP- Load-005-007 "HF Truck To V-2816 New"
 - SOP IBU-ACY-007-05 "Transfer HF From 4HAP to V-8403 New"
- ▶ HF transfers are on an as needed basis and typically occur no more than 1 time per year.

Data on Confidential Disc

FLARE	Initial EPA Findings Btu/scf	Current Status Based on PI Compliance Data
4HAP	33 Events < 300	0 Events <300

GUR Flare

- ▶ EPA identified 60 GUR Flare events in which the steam to vent gas ratio was > 10 (lbs steam per lbs vent gas).
- ▶ All events occurred during maintenance activities.
 - 43 events resulted in no emissions.
 - 17 events resulted in emissions below permitted rates.
 - 15 events occurred during turnaround activities when the venting was low and empty vessels were present.
 - 1 event resulted from steaming a tank for maintenance. Steam was increased to the flare to control visible emissions as per permit requirements.
 - 1 event occurred just after re-commissioning the flare for startup. Nitrogen purges were reduced resulting in lower venting rates.

Data on Confidential Disc

FLARE	Initial EPA Findings steam to vent gas ratio	Current Status Based on Supplemental Information
GUR	60 Events > 10	0 Events > 10

MO-3 Flare

- ▶ The MO-3 flare was initially classified and designed to operate as a non-assisted flare with center steam addition to prevent flash back.
- ▶ Status of flare has changed to steam assisted due to the addition of center steam.
- ▶ Using 272 BTU/SCF as hydrogen's Lower Heat Value (LHV), MO-3 flare would require modification to achieve 300 BTU/SCF.

MO-3 Flare Actions to Address

- ▶ Ticona adjusted the LHV value of hydrogen to 1212 BTU/SCF based on guidance from the EPA.
 - Utilized the adjusted LHV value of hydrogen to calculate the limit for the net heating value of the gases in the combustion zone (NHVcz-limit).
 - NHVcz is the recommended approach.
- ▶ The new calculated limit, based on the adjusted hydrogen LHV, must exceed the NHVCZ of the flare ($\text{NHVcz} \geq \text{NHVcz-limit}$).
- ▶ Revised calculations demonstrate the following:
 - MO-3 NHVcz-limit is 336.7 BTU/SCF.
 - NHVcz is approximately 361.5 BTU/SCF (without modification).
 - MO-3 Flare satisfies the regulatory requirement and does not require any modification.

Data on Confidential Disc

FLARE	Initial Findings Btu/scf	Current Status Based on Calculated Data
MO-3	676 Events < 300	0 Events <300

MO-4 Flare

- ▶ Initially classified and designed to operate as non-assisted flare with center steam addition to prevent flash back.
- ▶ The status of this flare has changed to steam assisted due to the addition of center steam.
- ▶ Adjusted LHV value of hydrogen (1212 BTU/SCF) was implemented based on EPA guidance.
- ▶ Adjusted LHV value of hydrogen was used to calculate the limit for the net heating value of the gases in the combustion zone (NHVcz-limit).
- ▶ The combustion zone limit calculations for the MO-4 flare suggested that the unit requires more natural gas to meet the regulatory requirement.
- ▶ For the MO-4 flare the NHVcz-limit is calculated to be 343 BTU/SCF and the current NHVcz, at high rates, is approximately 312.8 BTU/SCF.

MO-4 Flare Actions to Address

- ▶ Calculations for MO-4 Flare BTU value illustrated a deficiency of approximately 30 BTU/SCF, equating to approximately 166M SCFH natural gas.
- ▶ Ticona executed a project to replace approximately 300 feet of 6" pipe with 8" pipe and install a 6" control valve in place of a 4" control valve at a cost of approximately \$250M.
- ▶ In September 2012, the new 8" pipe was fabricated and put in place parallel to the existing 6" line.
- ▶ During the December 2012 unit turnaround, tie-ins were made for this new line.
- ▶ New line was commissioned on December 10, 2012.
- ▶ Data was collected from 12/10/2012 through 1/8/2013 to demonstrate compliance assurance since startup using 8" NG piping.

Data on Confidential Disc

FLARE	Initial EPA Findings Btu/scf (1/7/2011)	Current Status Based on Supplemental Information
MO-4	83 Events < 300	0 Events <300

Conclusion & Next Steps

- All findings for the flares have been addressed and supporting data has been supplied to the agency.
 - **MS flare** – data provided from 2007 to present with no issues.
 - **GUR flare** – data provided from 1/1/2013 to present; included multiple events with no issues.
 - **4HAP flare** – data provided from 2011 to present with multiple transfer events and another event is not expected for ~13 months.
 - **MO-3 flare** – data provided from 2007 to present using new hydrogen value with no issues.
 - **MO-4 flare** – data provided from 12/2012 to present. This flare will only be used during emergencies or incinerator shutdowns, we do not anticipate having additional data until late second quarter of 2013. We will submit supplemental data at that time unless an event occurs sooner.

Questions and Next Steps